A case of congenital single testis with testicular cancer patient and azoospermia who was able to collect spermatozoa with ipsilateral Onco-TESE

Kazumasa Hayashi[1], Hiroshi Masuda[2], Teruo Inamoto[3], Haruhito Azuma[3], and Hirotsugu Oku[4]

[1]Affiliation not available
[2]Tesseikai Neurologial Surgery Hospital
[3]Osaka Medical College Hospital
[4]KItahama RD Clinic

August 23, 2020

Abstract

Radiotherapy and chemotherapy in patients with testicular cancer often cause infertility. We describe congenital single testis patient with testicular cancer and azoospermia who was underwent ipsilateral Onco-TESE during radical orchiectomy and succeeded in sperm collection, followed by having a healthy child after ICSI.

Title

A case of congenital single testis with testicular cancer patient and azoospermia who was able to collect spermatozoa with ipsilateral Onco-TESE

Kazumasa Hayashi[1](uro063@osaka-med.ac.jp), Teruo Inamoto[2] (tinamoto@osaka-med.ac.jp), Haruhito Azuma[2] (uro001@osaka-med.ac.jp), Hiroshi Masuda[3](h-masuda@aino-hp.koshokai.or.jp), Hirotsugu Oku[4] (info@lc-kitahama.jp)

Affiliations: 1 Department of Urology, Ishinkai Yao Sogo Byoin , Yao, Osaka, Japan.

2 Department of Urology, Osaka Medical College, Takatsuki, Japan.

3 Department of Urology, Tesseikai Neurosurgical Hospital, Shijyounawate, Japan.

4 Department of Urology, Kitahama Ledies Clinic, Osaka, Japan

Corresponding Author: Kazumasa Hayashi, MD, PhD

Phone: +8190-3671-5134 Email: uro063@osaka-med.ac.jp

Address: Department of Urology, Ishinkai Yao Sogo Byoin, Yao , Osaka, Japan.

Key words: Onco-TESE, cancer patient, congenital single testis

Key Clinical Message: A congenital single testis patient had testicular cancer and became azoospermia. Ipsilateral onco-TESE performed at the same time as the orchidectomy and sperm could be collected. He was able to have a healthy child later by performing ICSI.

Introduction

Patients with TGCT (testicular germ cell tumor) have the highest prevalence among men aged 15 to 35 years, accounting for 1.0% to 1.5% of male neoplasms.[1] The incidence of the testicular dysgenesis syndrome (TDS) (decreased spermatogenesis, hypospadias, cryptorchidism, testicular tumors) in men has increased in recent decades, and four events are often interrelated.[2]Patients with TGCT are more likely to cure, although post-operative chemotherapy and/or radiotherapy damage the rest of healthy testis, resulting in infertility. Several papers have pointed out that testicular tumors and treatments cause male infertility and recommend cryopreservation of sperm before treatment.[3-5]Infertility becomes the mental damage for a young patient. Most of these young patients will not know that treatment of cancer may make them infertility at the time of diagnosis, and they will not have plans to have children. For patients, the knowledge that germ cells were cryopreserved prior to the start of treatment, whether or not they were used as a means of assisted reproductive therapy, enhances the patient's quality of life and comfort.[6] More than 50% of patients with cured testicular tumors want a child after treatment, and 75% have no children at the time of diagnosis.[7] The American Society of Clinical Oncology recommends sperm cryopreservation for fertility preservation, but few patients receive infertility treatment.[8] Of the patients, only 51% participated in the sperm bank and only 24% actually had their sperm cryopreserved, according to findings from two major cancer centers.[9]Patients with TGCTs have cure rate of 80% to more than 90% by combining surgery, radiation, and chemotherapy based on diagnosis and staging, and the trend is currently upward.[10] After treatment, strict follow-up and salvage therapy help maintain good cure rate.[11-13] Testicular sperm extraction (TESE) may be performed to retain fertility in patients with TGCTs and azoospermia.

We describe congenital single testis patient with testicular cancer and azoospermia who was underwent ipsilateral Onco-TESE during radical orchiectomy and succeeded in sperm collection, followed by having a healthy child after intracytoplasmic sperm injection (ICSI).

Case Report

A 26-year-old man noticed a painless enlargement of right scrotum and visited the urology department at a nearby hospital. In childhood, he was diagnosed with a cryptorchidism and underwent a test laparotomy, but his left testis was not confirmed. Later, he was diagnosed with a left testicle defect. The right testis was swollen to a diameter of 5 cm without pain. Ultrasonography revealed a 5 cm hypoechoic mass in the right testis. Simple CT scan revealed a uniform mass of about 5cm inside the scrotum and no obvious metastasis. A laboratory examination showed almost normal levels. HCG-β level 0.46 ng/ml, HCG level 16.6 mIU/ml, AFP level 2.3 ng/ml, LH level 2.1 mIU/ml, FSH level 4.7 mIU/ml, and testosterone level 470 ng/dl.

He was not married but had a fiancé, and he wanted to cryopreserve the sperm. A semen test was performed at ART Clinic to preserve fertility, but he was diagnosed as azoospermia. His karyotype and chromosome Y were normal and without microdeletions. He was referred to our hospital, and Onco-TESE and radical inguinal orchiectomy were scheduled to be performed at the same time. Surgery was performed and most of the testicles were occupied by gray-white mass without bleeding or necrosis (Fig 1). Despite the tumor occupying most of the right testis, normal seminiferous tubules were detected on the head side of the testis and normal sperm were collected when microscopically collected (Fig 2). They were cryopreserved.

Histopathological examination revealed tumor cells containing lymphocytes and clear cytoplasm, and the diagnosis was pure seminoma, pT1N0M0 (Fig 3). In a portion of normal seminiferous tubules, spermatogenesis was confirmed (Fig 4). A small number of sperm was found in the seminiferous tubule, and the Johnson score was 8.

His postoperative course was uneventful, no adjuvant therapy was performed, and close follow-up with imaging was undertaken. No obvious tumor recurrence has been observed so far, and the patient have been receiving continuous testosterone supplementation due to low testosterone levels after orchiectomy.

Later, he married, the wife visited gynecology for underwent detailed examinations such as hysteroscopy, transvaginal ultrasound, and blood tests, and she was diagnosed as normal. They were performed ICSI using frozen sperm, and his wife became pregnant and a healthy child was born on gestational week 39 + 3. The newborn was a boy, born at a weight of 3060g and healthy without TDS syndrome.

Discussion

In this patient case, onco-TESE was the last chance to preserve fertility, because he had been diagnosed with azoospermia. It has been previously reported that testicular tumor is associated with decreased spermatogenic ability, and the sperm concentration in testicular tumor patients was about 1/3 that of general males and the total sperm count was about 1/6.[14] Most spermatogenesis was affected after the chemotherapy, and there was the report that spermatogenesis recovered in 75% of patients 18 months later, but it was clear to lose of fertility after orchiectomy because he was congenital single testicular patient.[15] According to literature statistics, the frequency of diagnosed congenital single testis during surgery for cryptorchidism in Europe and the United States is 4%.[16] Assisted reproductive technology has advanced in recent years, allowing infertile patients to achieve fertilization by using cryopreserved sperm.[17,18] Papers from several groups of investigators[6,19-21] have been reported that Onco-TESE is possible in patients with azoospermia and testicular cancer followed by the use of assisted reproduction to birth of healthy baby by cryopreserved sperm, but in each case there were no reports of congenital single testis with testicular cancer patient. This case shows that Onco-TESE can be done in patients with congenital single testis such as TDS syndrome. It is important to operate as many people as possible with Onco-TESE.

Conclusion

Performing TESE during radical orchiectomy provides a unique opportunity to preserve fertility among single testis with testicular cancer patients without causing additional physical damage. We successfully performed sperm retrieval through Onco-TESE for azoospermia in congenital single testis patient with a testicular cancer, and a child birth following ICSI using cryopreserved testicular spermatozoa.

Acknowledgments

We thank the patient, his wife, and everyone involved in the treatment for giving us the opportunity of this case report. Published with written consent of the patient.

Conflict of Interest Statement

There are no conflicts of interest in publishing this article.

Author Contributions

All authors have read and reviewed the manuscript. Hiroshi Masuda: performed an orchidectomy and Onco-TESE with the author and followed up postoperatively. Teruo Inamoto and Haruhito Azuma: reviewed the manuscript. Hirotsugu Oku: was a doctor in an ART clinic who referred patients to our hospital and successfully performed ICSI with cryopreservation sperm.

References

1. Fraietta R, Spaine DM, Bertolla RP, Ortiz V, Cedenho AP. Individual and seminal characteristics of patients with testicular germ cell tumors. *Fertil Steril* . 2010;94(6):2107-2112. doi:10.1016/j.fertnstert.2009.12.021

2. Skakkebæk NE, Rajpert-De Meyts E, Main KM. Testicular dysgenesis syndrome: an increasingly common developmental disorder with environmental aspects: Opinion. *Hum Reprod* . 2001;16(5):972-978. doi:10.1093/humrep/16.5.972

3. Horwich A, Shipley J, Huddart R. Testicular germ-cell cancer. *The Lancet* . 2006;367(9512):754-765. doi:10.1016/S0140-6736(06)68305-0

4. Møller H, Skakkebæk NE. Risk of testicular cancer in subfertile men: case-control study. *BMJ* . 1999;318(7183):559-562.

5. Rives N, Perdrix A, Hennebicq S, et al. The semen quality of 1158 men with testicular cancer at the time of cryopreservation: results of the French National CECOS Network. *J Androl* . 2012;33(6):1394-1401. doi:10.2164/jandrol.112.016592

6. Ostad M, Liotta D, Ye Z, Schlegel PN. Testicular sperm extraction for nonobstructive azoospermia: results of a multibiopsy approach with optimized tissue dispersion. *Urology* . 1998;52(4):692-696. doi:10.1016/s0090-4295(98)00322-7

7. Schover LR, Brey K, Lichtin A, Lipshultz LI, Jeha S. Knowledge and experience regarding cancer, infertility, and sperm banking in younger male survivors. *J Clin Oncol* . 2002;20(7):1880-1889. doi:10.1200/JCO.2002.07.175

8. Oktay K, Harvey BE, Partridge AH, et al. Fertility Preservation in Patients With Cancer: ASCO Clinical Practice Guideline Update.*JCO* . 2018;36(19):1994-2001. doi:10.1200/JCO.2018.78.1914

9. Quinn GP, Vadaparampil ST, Lee J-H, et al. Physician referral for fertility preservation in oncology patients: a national study of practice behaviors. *J Clin Oncol* . 2009;27(35):5952-5957. doi:10.1200/JCO.2009.23.0250

10. Chaudhary UB, Haldas JR. Long-term complications of chemotherapy for germ cell tumours. *Drugs* . 2003;63(15):1565-1577. doi:10.2165/00003495-200363150-00004

11. Souchon R, Krege S, Schmoll HJ, et al. [Interdisciplinary consensus on diagnosis and therapy of testicular tumors. Results of an update conference based on evidence-based medicine. German Testicular Cancer study Group (GTCSG)]. *Strahlenther Onkol* . 2000;176(9):388-405. doi:10.1007/pl00002347

12. Aareleid T, Sant M, Hédelin G. Improved survival for patients with testicular cancer in Europe since 1978. EUROCARE Working Group.*Eur J Cancer* . 1998;34(14 Spec No):2236-2240. doi:10.1016/s0959-8049(98)00313-x

13. Albers P, Albrecht W, Algaba F, et al. EAU guidelines on testicular cancer: 2011 update. *Eur Urol* . 2011;60(2):304-319. doi:10.1016/j.eururo.2011.05.038

14. Petersen PM, Skakkebaek NE, Vistisen K, Rørth M, Giwercman A. Semen quality and reproductive hormones before orchiectomy in men with testicular cancer. *J Clin Oncol* . 1999;17(3):941-947. doi:10.1200/JCO.1999.17.3.941

15. Lange PH, Narayan P, Vogelzang NJ, Shafer RB, Kennedy BJ, Fraley EE. Return of fertility after treatment for nonseminomatous testicular cancer: changing concepts. *J Urol* . 1983;129(6):1131-1135. doi:10.1016/s0022-5347(17)52607-5

16. Levitt SB, Kogan SJ, Engel RM, Weiss RM, Martin DC, Ehrlich RM. The impalpable testis: a rational approach to management. *J Urol* . 1978;120(5):515-520. doi:10.1016/s0022-5347(17)57256-0

17. Palermo GD, Cohen J, Alikani M, Adler A, Rosenwaks Z. Intracytoplasmic sperm injection: a novel treatment for all forms of male factor infertility. *Fertility and Sterility* . 1995;63(6):1231-1240. doi:10.1016/S0015-0282(16)57603-1

18. Matsushita K, Yamaguchi K, Li F, et al. Achieved pregnancy with the delivery of a healthy child by TESE-ICSI 7 years after bilateral adult orchidopexy: a case report. *Andrologia* . 2014;46(8):948-950. doi:10.1111/and.12174

19. Roque M, Sampaio M, Salles PG de O, Geber S. Onco-testicular sperm extraction: birth of a healthy baby after fertility preservation in synchronous bilateral testicular cancer and azoospermia.*Andrologia* . 2015;47(4):482-485. doi:10.1111/and.12292

20. Verhoeven RHA, Coebergh JWW, Kiemeney L a. LM, Koldewijn EL, Houterman S. Testicular cancer: trends in mortality are well explained by changes in treatment and survival in the southern Netherlands since 1970. *Eur J Cancer* . 2007;43(17):2553-2558. doi:10.1016/j.ejca.2007.08.022

21. Hamano I, Hatakeyama S, Nakamura R, et al. Onco-testicular sperm extraction (Onco-TESE) from a single testis with metachronous bilateral testicular cancer: a case report. *Basic Clin Androl* . 2018;28. doi:10.1186/s12610-018-0066-2